D301.71 29/3

Combat Crew

strategic air command

MARCH 1978

UNIVERSITY OF FLORIDA LIBRARIES
MAR 1978
DOCUMENTS DEPT.

INGREDIENTS OF PROFESSIONALISM

Maj. Gen. David L. Gray
Commander, 1st STRAD

Professionalism is a term which has special meaning to the combat and maintenance crew member. Performing in a professional manner is often the difference between mission accomplishment and failure, or even life and death. Whether flying an aircraft, performing missile alert, or loading a weapon, the crew member must perform in the most professional manner possible if the job is to be done correctly . . . every time.

But what is professionalism? Obviously, it involves the technical aspects of knowing our job, being up-to-date on the latest tech data and satisfactorily passing our Stan Board and evaluation checks. However, professionalism goes far beyond these elements. It also involves somewhat intangible qualities which are far more difficult to assess.

I like to make this assessment in terms of three words: integrity, pride, and loyalty. Integrity, of course, involves a code of values or ethics. Some of these values are set by regulation or tradition while others may be established by the commander. However, perhaps the most important values are established by the individual himself. It is within this latter context that integrity plays a particularly important role for the true professional.

In establishing one's professional ethics, some difficult real value judgements have to be made. These judgements are based upon our true moral fiber. Are we willing to tell the boss the truth regardless of the consequences, or do we simply tell him what we think he wants to hear? Do we follow the safety rules at all times or only when the safety officer or boss is present? Do we take the simple way out of a situation or do we meet a problem head-on? Do we tell the truth because it's convenient at the moment or because we know it's the right thing to do regardless of possible consequences? Our answer to this type of questions will give us a gauge as to our professional integrity. Said another way, in the words of Thomas Bagington MaCauley, "The measure of a man's true character is what he would do if he knew he would never be found out."

Pride is another term with many meanings. Personal pride involves meeting a set of high, self imposed standards designed to extract the best from ourselves, both at our jobs and as human beings. Thus, in the military context, pride includes such attributes as affability, good manners, civility and respect. In this sense, pride is a two-way street. You can not expect others to respect you unless by word and deed your conduct has earned that respect. The pride you display in yourself and your profession directly affects those working around you. All people need pride to be successful at anything; if we have pride in ourselves and instill it in those with whom we work and supervise, our units will be 'prideful' organizations.

As crew members we must work as an integral team. A most important element in making a crew unit work effectively is to establish a positive interrelationship among the crew members themselves. Individual pride, which includes courtesy and respect for our fellow crew members, plays a most important role in attaining this goal. The pilot must respect the navigator, the MCCC his deputy, the maintenance team chief his technicians, and vice versa. Individual pride in ourselves shows and is a prime means of gaining and displaying this respect.

How can we measure our standard of pride? Perhaps looking again at some key questions will help. Do we salute proudly or only because it is required? Do we listen to what a subordinate has to say and truly evaluate his or her ideas? Do we keep our cool when in the midst of chaos or when things aren't going our way? Do we directly confront people with whom we have a conflict, or talk behind their back? Do we complete every job to the best of our ability because that is our individual standard and nothing less will do? If we can answer each one of these questions positively, it's a pretty safe bet we have the individual pride required of a professional.

Now let's take a look at my third ingredient for professionalism . . . loyalty. Loyalty adds up to allegiance. Allegiance to the country we are sworn to defend, allegiance to the principles and policies of the organization we serve, allegiance to both our supervisors and subordinates and finally, allegiance to ourselves. In short, loyalty is a principle component of any military unit. A combat crew or a maintenance team cannot adequately and safely function without it. A professional must give it willingly and unfailingly.

If we are to be true professionals, we must be selflessly dedicated to our mission, our job, and our unit. We must support our superiors and at the same time, remain true to our subordinates. In short, loyalty ties right back to integrity. We must establish a credible set of professional ethics and be loyal to them. At the same time, we must have personal and professional pride in all that we are and all that we do. And finally, we must have the integrity required to admit to ourselves that we are falling short in meeting our personal or professional standards.

I challenge each of you to take a close look at yourself. How do you measure up? Are you a professional in every sense of the word? Your country, the Air Force and your crew-mate deserve nothing less. ★★

FLARE

Combat Crew

Magazine of the Strategic Air Command - 28th Year of Publication

GEN. RICHARD H. ELLIS
COMMANDER IN CHIEF, SAC

MAJ. GEN. EARL G. PECK
Deputy Chief of Staff, Operations

COL. JOHN R. SHIPE
Director of Safety

STAFF

LT. COL. RICHARD W. BLATTER
Editor

G. FRANCIS FARRELL
Associate Editor

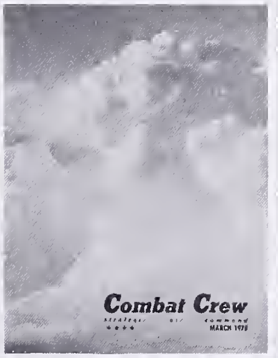
Sgt. GERALD F. MORIARTY
Art Editor

MARY JANE ABBOUD
Editorial Assistant

UNIV. OF FLORIDA LIBS.
DOCUMENTS
DEPARTMENT
U.S. DEPOSITORY

IN THIS ISSUE

Stormy Weather 4
Reduced Thrust Takeoffs 8
The Long Road Home 11
Alternate Rendezvous 12
Big Instrument 14
Dirty Laundry Syndrome 16
Emergency Air Bleed Leak 19
Coping With the Compass 20



ON OUR COVER

This is the time of year when the thunderstorm hazard is on the increase. For more on this subject see page 4.

SACRP 127-1 **VOL. XXVIII. NO.3** **MARCH 1978**

COMBAT CREW is an internal publication of the Strageic Air Command with the sole purpose of promoting safety. The contents of this magazine are informative and not to be considered as directive in nature. Facts, testimony and conclusions of all accidents printed herein may not be construed as incrimination under Article 31 of the Uniform Code of Military Justice. All names, dates and places used in conjunction with accident stories are fictitous. Written permission must be obtained from Headquarters, Strategic Air Command, before any material may be reprinted by other than U.S. Air Force organizations. Use of funds for printing this publication has been approved by Hq. USAF. Contributions are encouraged, as well as comments and criticisms. Direct correspondence with the Editor is authorized. Address correspondence to Editor, COMBAT CREW, Hq. SAC (DOSE), Offutt AFB, NE. 68113.

STORMY WEATHER

Each year the topic of thunderstorm penetration by military aircraft is stressed in numerous publications, at flying safety meetings, and in countless daily briefings. Yet, each year, as regularly as the articles appear so do mishap reports concerning damage acquired by military aircraft that have flown through, into, or too near thunderstorms. This type of first-class "goof" is not restricted to one particular group of pilots, for both the old and new birdmen appear in this type of report. Too often a complacent attitude concerning this weather phenomena leads to a hazardous flight condition that could have been avoided. This must indicate a direct relationship between knowledge and practice.

At this time of year it is of particular value to reemphasize certain pertinent facts concerning thunderstorms, including a description, associated weather, preparation for encountering and avoidance.

Scientists estimate that an average of 44,000 thunderstorms occur each day, with as many as 16,000,000 over the surface of the earth in one year. With this great number of storms occurring each year, chances are good that you will encounter one in flight.

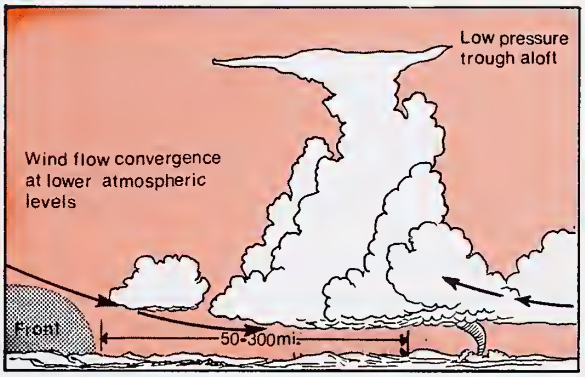
The cumulonimbus cloud can be considered a complete weather museum, exhibiting practically every weather condition known to man. This huge cloud may include severe turbulence, rain, snow, hail, icing, lightning, and result in gusty surface wind. Other hazardous factors are: blowing dust, freezing rain, tornadoes and low-level wind shear. A well-developed thunderstorm may cover many square miles and extend from near the ground to over 50,000 feet.

A thunderstorm is produced by a given set of conditions. These are unstable air of relatively high moisture content and some form of lifting action. There are three definite stages in the growth, life and death of a thunderstorm. They are the cumulus-stage, the mature stage, and the dissipating or anvil stage. During the cumulus stage, the main feature is the development of the updraft. In this state, water droplets are carried upward and suspended in the ascending air currents. The transition from the cumulus to the mature stage occurs when rain is observed at the earth's surface. It is during this stage that both updrafts and downdrafts take place. Downdrafts, when they reach the ground, create strong and gusty surface winds. Downdrafts also cause our most recently recognized adversary — wind shear. During the anvil stage, the updrafts cease until the entire horizontal and vertical extent of the thunderstorm contains only downdrafts. As the downdrafts expand within the thunderstorm, the decrease in the volume of ascending air causes a decrease in the amount of rain released. Consequently the thunderstorm dissipates.

Generally, thunderstorms have similar physical features regardless of location or time. They differ, however, in intensity, associated weather, and degree of development. The classification of thunderstorms is usually according to the manner in which the initial lifting action is accomplished. The types of thunderstorms are as follows:

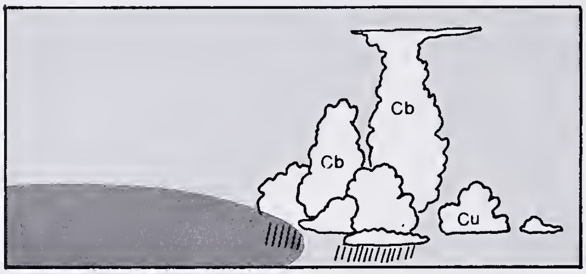
Prefrontal or Squall Line Thunderstorms. Occasionally, warm, moist, unstable air will begin to rise 75 to 300 miles ahead of a cold front. With these rising air currents a solid line of thunderstorms will form parallel to the cold front.

Cold Front Thunderstorms. Cold front thunderstorms appear in the warm air near the frontal surface in a continuous line parallel to the frontal surface. This type of thunderstorm is readily visible while approaching the front from any direction. The base level of this type of storm is usually closer to the ground than the warm front type.

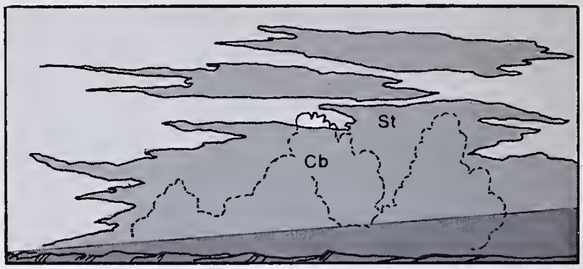

Low pressure trough aloft
Wind flow convergence at lower atmospheric levels
Front
50-300mi.

Squall Line

Warm Front Thunderstorms. Warm front thunderstorms generally occur in the warm, moist, unstable air which is overtaking the retreating colder, denser air mass. Because of the shallow slope of the warm front, stratiform clouds usually obscure the thunderstorm clouds which have formed at a high level. With these prevailing conditions it is possible



Cold Front Thunderstorm



Warm Front Thunderstorm

for an aircraft to move from smooth air into an area of extreme turbulence in a short period of time. These warm front thunderstorms are usually widely scattered and are most active from late evening to early morning.

Orographic Thunderstorms. This type of thunderstorm forms when moist unstable air is forced up and over mountainous regions. They develop rapidly and may cover a very large area. An orographic thunderstorm frequently remains stationary on the windward side of mountains or hills for several hours. These storms are easy to identify when they are approached from the lee side of the mountains. However, the opposite is true when coming from the windward side, as they are often hidden by stratiform clouds depending on the flight level.

Occluded Front Thunderstorms. Occluded front thunderstorms, usually associated with a warm front type occlusion, occur along the upper cold front where the lifting of the warm air is intensified. Like the warm front type, these are embedded in stratiform clouds and give little warning before encountering them.

Air Mass Thunderstorms. Convective thunderstorms form with a greater frequency than any other type. They occur over land or water in most areas of the world, and are most common during the summer months in the temperate zone. They normally form over land in the afternoon, when the sun is providing maximum heating of the earth. Convective thunderstorms may also develop in coastal regions when cool moist air from the water is heated as it moves over the warmer land mass. They are easily recognized during the day by their towering clouds, or at night by lightning.

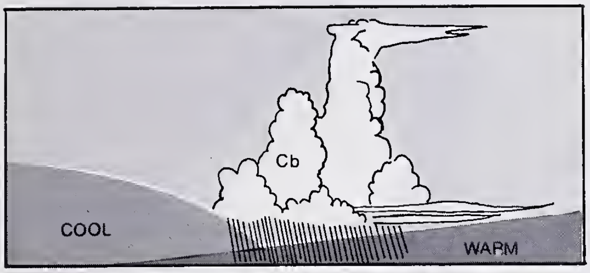
Thunderstorms present very definite hazards to flying. The main characteristics are turbulence, hail, icing, lightning and precipitation of varying amounts. Updrafts and downdrafts associated with thunderstorms vary greatly in intensity with horizontal coverage varying from a few feet to several thousand feet. Updrafts are much stronger than downdrafts (up to 6000 fpm have been recorded) and begin near the base of the cloud and extend upward almost to the top. They tend to increase in velocity with altitude, at least through the lower two-thirds of the thunderstorms.

Gusts in the thunderstorms are primarily responsible for the tubulence found in cumuliform clouds. Also, the gust front is a prime source of dangerous low level wind shear. Aircrews should be alert for this hazard when thunderstorms are in the vicinity during approach and landing.

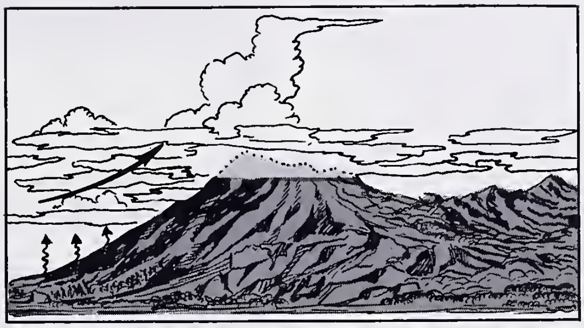
Thunderstorms can also be a source of hail. Large hailstones are extremely dangerous to encounter at even relatively slow speeds. Hail is most generally found in the upper precipitation levels, and is frequently carried aloft in the updrafts. It can then be hurled several miles into the clear air outside the thunderstorm cell. Sometimes the hail appears to fall from the anvil or other overhanging clouds.

Icing problems encountered in the proximity of thunderstorms can be of structural and/or induction type. Clear structural icing is caused by large supercooled water droplets freezing on the aircraft, and can form in large amounts in a relatively short time. While it is possible to experience induction icing within the thunderstorm itself, once a B-52 required five engine changes due to damage from ice ingestion during a flight in **clear** air. In this particular instance, enough invisible moisture was present in the atmosphere to form ice on the engine inlet guide vanes which broke off and damaged the compressor blades. Proper use of anti-icing equipment is mandatory for a safe flight in and near thunderstorms. Research indicates that the most severe icing normally is encountered in clouds at or near minus five degrees Celsius.

The most obvious and logical way to avoid a thunderstorm area is by thorough mission planning, which is a prerequisite for all safe flights. Check the forecast weather thoroughly, then plan your mission accordingly to traverse the best area. Have an alternate route planned and keep in mind that squall



Warm Front Occlusion Thunderstorm



Orographic Thunderstorm

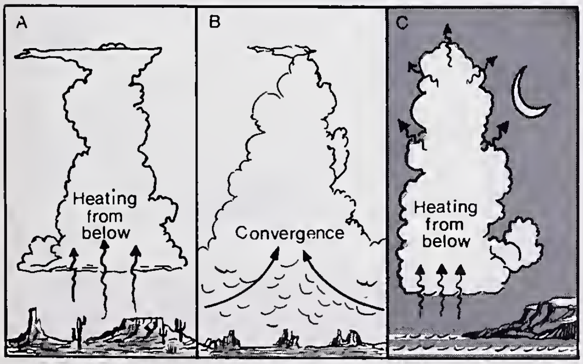
lines or severe weather areas can result in large deviations from planned route or possible termination at another base. Don't let "get-home-itis" tempt you into a headlong plunge through a hail-filled wind tunnel.

The aircraft you're flying probably has radar; so let the navigator keep an eye on any suspected clouds. A properly used airborne radar can keep you far, far away from a cumulus disaster.

When you are at base operations putting the finishing touches on the flight plan, talk long and seriously with the weather people. Cover the current and forecast location of severe weather areas before leaving operations. The Military Weather Advisory (MWA), attached to all SAC Forms 597, depicts forecast CONUS thunderstorm areas. Forecast update times are also noted so current MWA information can be obtained from pilot to metro service (PMSV).

The IFR Supplement contains the required information to contact PMSV. If you are near thunderstorm activity, give the metro station the benefit of your unique position for observation of the storms and general weather conditions. Also, keep in mind that FAA centers or flight service stations may be of great assistance for information regarding the present location of thunderstorm cells and severe weather areas.

Convective Thunderstorm



A standardization evaluator, Captain Sam (Longfellow) Sadler, summed up thunderstorm flying as follows:

"Springtime Is Rhyme Time"

Give me your attention and lend me your ear—
spring has sprung and summer is near.
Now I will tell you of things to beware
as you launch your aircraft up into the air.
Temperatures will rise and winds will blow—
here are some things that you should know.
Of all the hazards of summertime flight,
thunderstorms will cause most of your plight.
The windshear and buffet, turbulence and hail
make even the best of us, at times, turn pale.
On takeoffs and landings, be especially wary—
figure it close so things don't get hairy.
The birds and the bugs while flying low-level
will cause you to cuss and swear at the devil.
The bounces and bumps make all of us ill;
if the ducks don't hit you, the dust-devils will.
Hot runways can give you a case of the floats,
so don't overshoot and stop in the oats.
The correct procedures are in your Dash One;
study and knowledge will pay in the long run.
So read the Dash One, pick it clean like a vulture—
I hope you've enjoyed this small bit of culture.

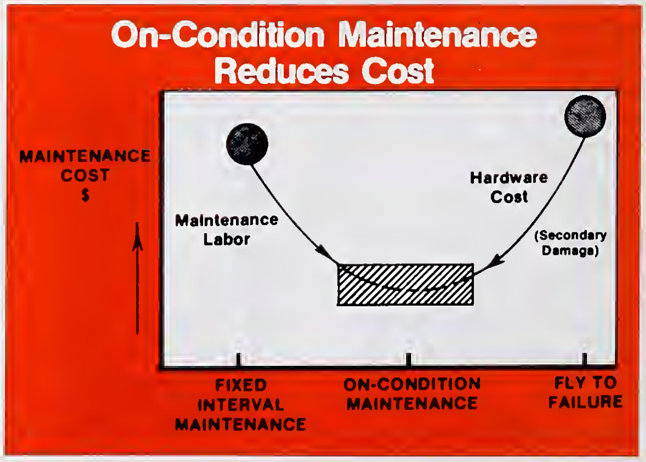
Get out your Dash One, blow the dust off the covers, and dig into the all-weather section. Become familiar with the appropriate things to do should you perchance, by some foul stroke of fate, find yourself in the CB's angry grip. Know the best aircraft configuration and power settings to enhance your chance of survival. Although it has been said thousands of times, the best way to stay out of thunderstorm alley is the old and proven method of the 180-degree turn. AFR 60-16, 15 Jul 77 directs that thunderstorms be avoided by the following distances:

- 20 miles at or above FL 230
- 10 miles below FL 230

These distances, of course, are minimum. In the game of thunderstorm versus aircraft, the more separation, the better.

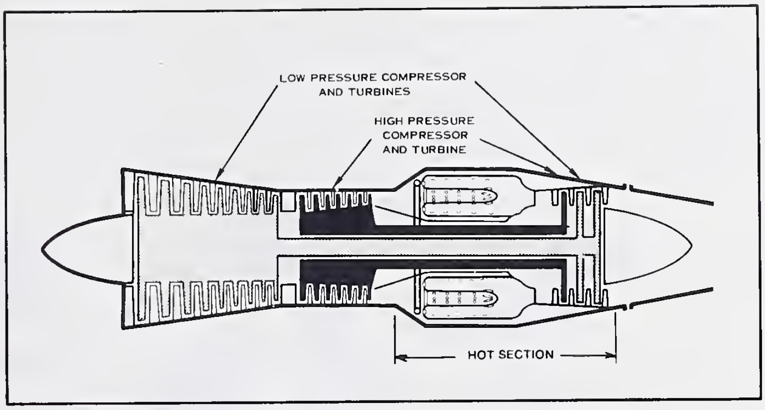
MORE RELIABLE ENGINES RESULT FROM . . .

REDUCED THRUST TAKEOFFS



Capt. Frank T. Werner
SAC/LGME, Offutt AFB

Operational supplements on reduced thrust takeoffs for the KC-135 and B-52 were distributed to all flying squadrons during November 1977. The procedures described in the supplement are contrary to what most pilots have been taught with regard to using full thrust during takeoff. Considering this fact and the absence of any background information on why the program was initiated, it is understandable that some crewmembers have been reluctant to utilize reduced power takeoff procedures.


LOW PRESSURE COMPRESSOR AND TURBINES
HIGH PRESSURE COMPRESSOR AND TURBINE
HOT SECTION

(Figure 2) Dual compressor axial flow turbojet.

We would like to take a few minutes of your time now to give you that background, explain the rationale of reduced thrust takeoffs, and list the advantages that you can expect from the program.

The concept of using less than full thrust for takeoff is not new. Many commercial airlines have been making partial thrust takeoffs since 1970. All the major airlines now use some type of partial thrust takeoff procedure when operating conditions permit. The Military Airlift Command (MAC) has been using reduced thrust takeoff procedures on the C-5A since 1972 and on the C-141 since 1974.

In the spring of 1974, personnel in the aircraft engineering division (LGME) at SAC headquarters learned that some airlines were realizing maintenance cost reductions ranging from 20% to 50% through the use of reduced thrust takeoff procedures and on-condition engine maintenance (Figure 1). On-condition maintenance is a compromise between fixed interval maintenance (high expenditure of man-hours) and fly to failure maintenance (high expenditure of hardware). Since we are always interested in saving some of our precious tax dollars, we began a study to determine if reduced thrust takeoffs could produce a payoff in SAC.

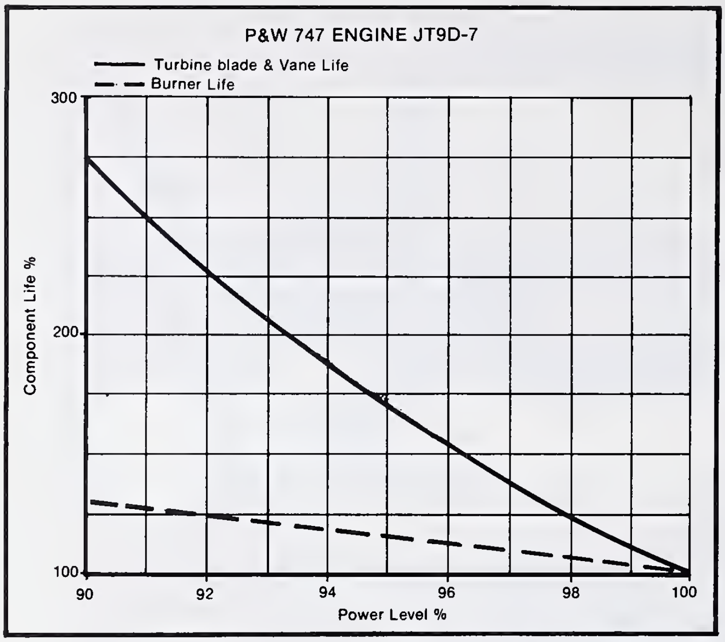
The SAC Aircrew Training Division (DOTT) asked the Air Logistics Center (OC-ALC) to evaluate the feasibility of reduced thrust takeoff procedures in SAC. The OC-ALC experts conferred with Boeing and in September 1975 reported that the procedure was practical for a large percentage of SAC takeoffs. A conference with representatives from HQ SAC (DOTT and LGME), OC-ALC, 1CEVG, Boeing and the Aeronautical Systems Division at Wright-Patterson AFB was held at Tinker AFB in April 1976. Representatives to this conference initiated action for the development of interim procedures using the "assumed temperature" method. This method, which is the most common procedure used by commercial airlines, is popular because it always gives conservative results. If the takeoff is safe with the thrust computed at the higher assumed temperature, then the actual thrust will be slightly greater due to the increased air density at the lower temperature. In addition, the pilot still has the option of using TRT if circumstances warrant the use of increased thrust.

During the spring of 1977, 1CEVG and selected standardization and evaluation crews conducted reduced thrust takeoff tests on the SAC aircraft involved in the reduced thrust program. The results were favorable and the data collected were incorporated in the operational supplement.

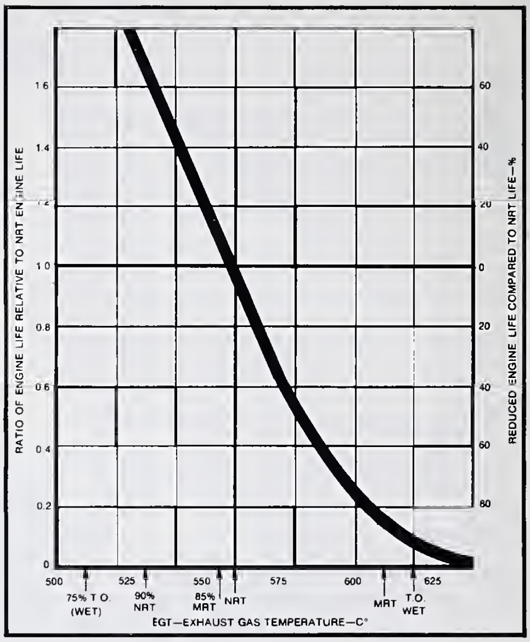
The objective of the interim operational procedure is to reduce takeoff EPR by 0.1 on all takeoffs where aircraft gross weight and field conditions allow it to be done safely. This reduction in EPR will mean a decrease in turbine inlet temperature of 50°C and a decrease of only 600 pounds of thrust per engine. This may seem like an insignificant temperature reduction, but actually the converse is true since a relatively small decrease in internal temperature yields a relatively large increase in "hot section" life (Figures 2, 3, 4). By minimizing the time that the turbine is exposed to extremely high temperatures, engine life can be substantially increased with a corresponding decrease in maintenance costs.

The most critical period for an engine is the time it is operated at MRT or TRT, for this is when the internal parts are subjected to the most stress, i.e., the highest temperatures and RPM (Figure 5). Reduced power during this critical period means a reduction in internal engine stress and less chance of catastrophic failure during takeoff and climb. These benefits can be translated into safer operations through increased engine reliability. Most pilots will agree that this is worthwhile.

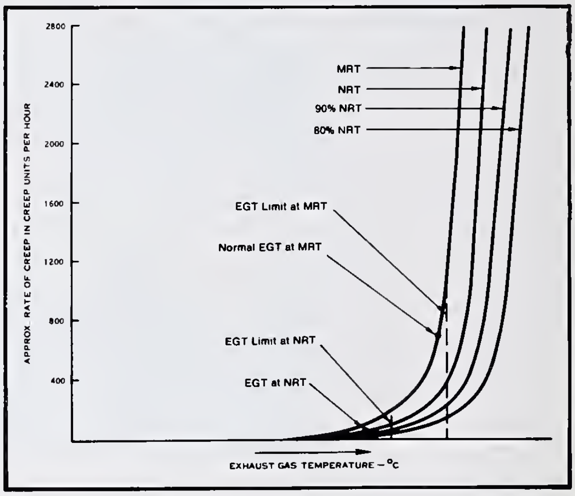
A report from the United Air Lines Engineering Department states that "the engine hot-section (burners, transition ducts and turbines) represent



(Figure 3) Component life versus power level.



(Figure 4) Effect of exhaust gas temperature on engine life.



(Figure 5) Turbine blade deformation rate for typical engine. Creep-long term deformation due to high temperature and stress.

the consumable section of the engine. It is estimated that the hot section maintenance expends about 75% of the basic engine maintenance dollar but only 37% of the new engine price. Reducing the takeoff turbine inlet temperature will diminish hot section distress with a corresponding significant increase in parts life."

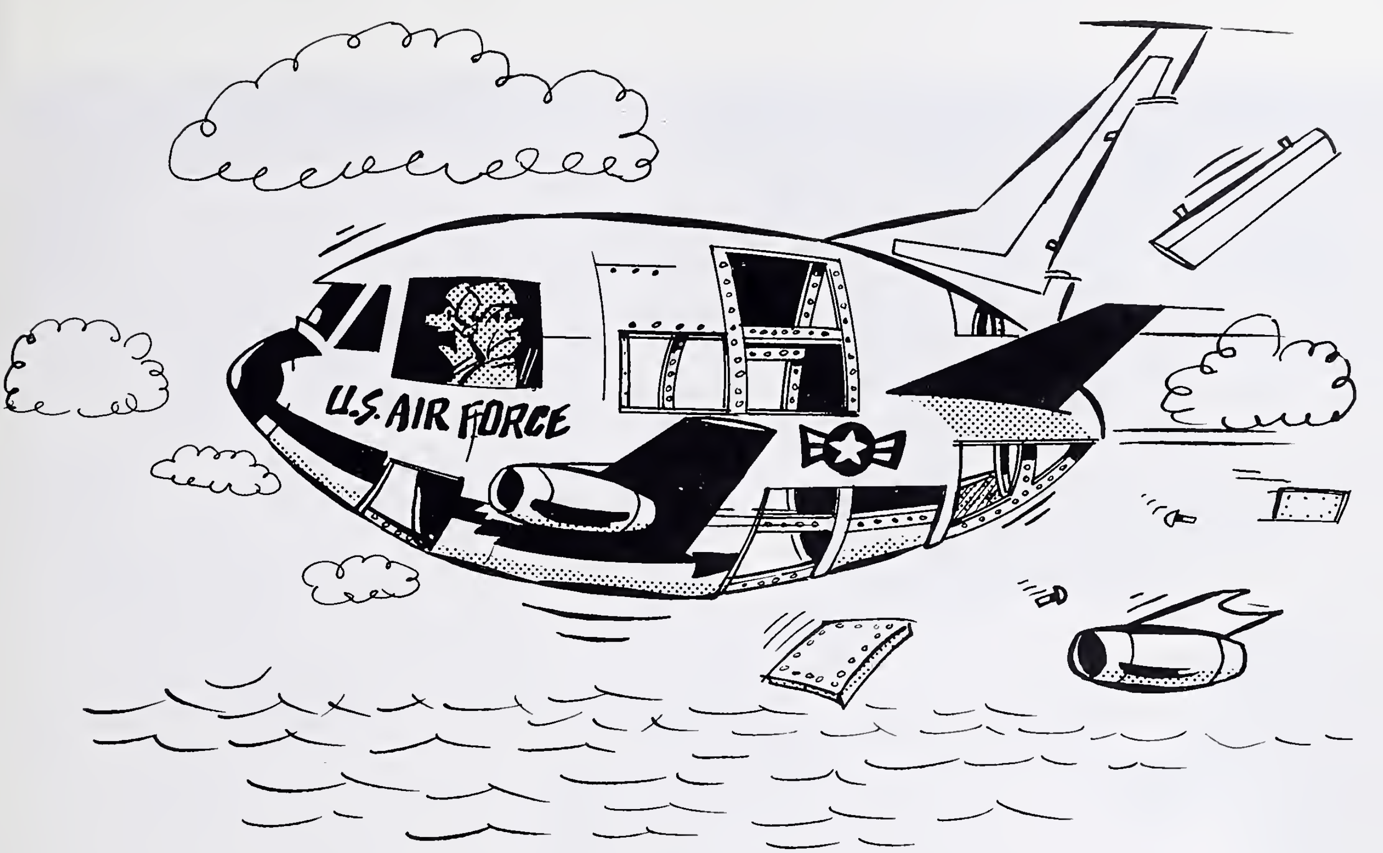
Pratt and Whitney estimates that a reduction in EGT of 80°F (44.4°C) on the J-57 and TF-33 engines will result in a 97% increase in the usable life of hot section parts, i.e., burners, transition ducts, first stage turbine blades and vanes. This increase in parts life is based on reduced EPR takeoff operation 100% of the time and is applicable to parts having zero operating hours initially.

A July 1976 Allison report on turbine temperature versus engine life indicates that a "50-degree centigrade reduction in blade metal temperature from 1010 degrees centigrade TIT results in a 775% increase in laboratory stress rupture life. Blade metal temperature is not TIT, but they are directly related."

It is quite evident from the previous discussion that any reduction in thrust (with the accompanying decrease in TIT) will result in an appreciable increase in the usable life of hot-section parts. The track record of reduced thrust takeoff programs within the airlines is impressive and in many cases the increase in hot-section parts life has exceeded expectations.

We are confident that SAC can achieve similar results with their KC-135's and B-52's but we need aircrew participation. This procedure is not optional, it should be used when takeoff conditions permit. The end result will be more reliable engines and safer flights.

ABOUT THE AUTHOR. Capt Werner is a systems and propulsion engineer assigned to SAC/LGME aircraft engineering division. He is a graduate of General Motors Institute with a B.A. in mechanical engineering. He attended UPT in 1970 and flew the KC-135 for 4 years at Rickenbacker and the C-135A and B at Offutt for over 2 years prior to his assignment to SAC headquarters.



THE LONG ROAD HOME

Capt. Paul E. McKay
92 BMW, Fairchild AFB

It had been a tedious week and we were all glad to be going home; even though that meant going on alert in two days. With that consideration in mind, we wanted to avoid any delays that would cause us to arrive the day before alert. It seemed a simple enough task: Takeoff from Lajes, follow your nose for 10 hours and land at Fairchild. However, I thought, (sounding like an old head), "I'll take the problems one at a time and try to avoid get-home-itis."

It did not take long for the first problem to surface. Arriving at the aircraft, we learned that we were shorted 5000 pounds of gas. This cut our gross weight to 270,000 and fuel at Fairchild to 30,000. I didn't mind getting off the runway a few hundred feet sooner but it was the other half of the bargain that concerned me. Destination weather was good, but that forecast would be about 12 hours old when we got there. Normally, it would be easy enough to make up the difference, but with 25,000 pounds of WRSK kit (maintenance supplies used for the task force), I wasn't sure how much my range performance would be degraded; also, headwinds were forecast to increase with altitude. Well, 30,000 at the fix is plenty; so that was that for the time being at least.

The next problem soon appeared. We bought a one-hour delay while our WRSK kit was used to provide a generator for another tanker. This delay cut our crew duty "pad" to only two hours. Now we're already short of gas and time, and not even off the ground yet. Well, my crew and I spent the time checking and double-checking this, that and everything. Finally, we started up and taxiied out. The weather was a ceiling of 5000 and a 30° crosswind at 15 knots. Cleared for takeoff, a mental check of my takeoff procedures and working the checklist as we cross the hold line; good water (another major ob-

Continued on page 20

THE KOHLER ALTERNATE RENDEZVOUS

1Lt. Dennis King, Jr.
28 AREFS, Ellsworth AFB

The following article describes one of many acceptable methods that can be used to accomplish an alternate rendezvous.

A perplexing problem faced by all KC-135A navigators is the alternate rendezvous. The alternate usually begins something like this: *Jiffy 69, Keith 23 negative radar contact IP inbound.* IP inbound and no radar contact is the tanker nav's key to turn toward the receiver and search for his beacon. More often than not, there is no return and the alternate rendezvous is underway.

Although our air refueling manual (-3) describes a number of means to effect the rendezvous, it does not give the navigator an approximation of how much elapsed time till he begins the turn down the air refueling track. The Kohler Alternate Technique provides precisely this information.

The Kohler Technique assumes transport category receivers close at 0.8 Mach (8 nm/min), fighter/interceptor category aircraft close at 0.9 Mach (9 nm/min), and KC-135 aircraft close at 0.7 Mach (7 nm/min). In other words, the combined velocity of a KC-135 and a transport category aircraft is 15 nm/min (KC-135 and fighter/interceptor 16 nm/min). After the basic premise, all that's required is two fixes and a stop watch. Instruct your copilot to fix when you call for the receiver's radial and DME. When the receiver reports his position, start your stop watch, plot both positions, measure the distance and enter Table 1 to obtain the elapsed time till you begin your turn down the air refueling track.

Clearly the way to a successful rendezvous is the precision fix. Although I emphasize the TACAN fix for both tanker and receiver, any combination of navigation aides may be used. For instance, the receiver may respond with an inertial distance from the ARCP and the tanker could utilize an ASN-7 present position or radar fix. The possibilities are limited only by the equipment available and the flexibility of the navigator.

TABLE 1

FIX TO FIX DISTANCE	TRANSPORT ELAPSED TIME UNTIL TURN	FIGHTER/INTERCEPTOR ELAPSED TIME UNTIL TURN
40	1 + 20	1 + 15
45	1 + 40	1 + 34
50	2 + 00	1 + 53
55	2 + 20	2 + 11
60	2 + 40	2 + 30
65	3 + 00	2 + 49
70	3 + 20	3 + 08
75	3 + 40	3 + 26
80	4 + 00	3 + 45
85	4 + 20	4 + 04
90	4 + 40	4 + 23
95	5 + 00	4 + 41
100	5 + 20	5 + 00
105	5 + 40	5 + 19
110	6 + 00	5 + 38
115	6 + 20	5 + 56
120	6 + 40	6 + 15

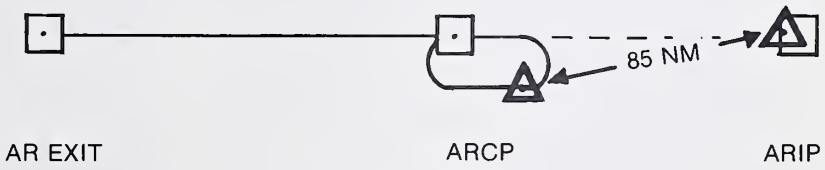


FIGURE 1

Consider Jiffy 69 (tanker) who just rolled out heading toward the receiver after the receiver reported the initial point inbound. The tanker navigator calls for the receiver's radial and DME. Simultaneously the tanker copilot notes the tanker's radial and DME and the navigator starts his stopwatch. The tanker navigator plots each fix and measures the distance. Assume this distance is 85 nm (see Figure 1). He now enters Table 1 and finds the elapsed time till he turns down the air refueling track is four min 04 seconds for fighter/interceptor category aircraft. That's all! It is just that simple and it works.

BIG INSTRUMENT

QUESTIONS AND ANSWERS

Capt. Dennis D. Carpenter
1st Combat Evaluation Group
Barksdale AFB

During the past month we have received the following questions concerning instrument procedures and techniques.

Q — Is it necessary to compute a visual descent point (VDP) for all nonprecision approaches?

A — At the present time it is not a requirement, but it is highly recommended that you do. The purpose of the VDP is threefold: First, it provides a point from which a safe transition to a visual approach and landing can be made using the descent gradient for your aircraft. Second, the use of the VDP will assist in avoiding a premature descent from the MDA and a subsequently flat and possibly dangerous approach. Finally, it forces us to think consciously about where the Missed Approach Point (MAP) is in relation to the runway threshold. For example, the MAP for the Hi-TACAN RWY 33 to Griffiss AFB (Fig 1) will place you at 501 feet HAT, ½ mile from the end of the runway. That may be a little too steep for a B-52 or KC-135 aircraft. The information necessary for determining the VDP for this approach is contained in Figure 1. If your answer is 2.6 or 2.7 DME, go to the head of the class.

Q — If I am flying the Hi-TACAN RWY 34 (Fig 2) to Pease AFB, when can I descend out of the 3,000 feet I must maintain on the arc?

A — You must maintain 3000 feet until reaching your computed lead point for the turn inbound. For example, if you compute your lead point to be 10 degrees, start your turn inbound as you cross the 170 degree radial and begin your descent to 1,700 feet.

Q — If I am being vectored for an ILS approach at glide path interception altitude and subsequently cleared for the approach, must I report departing that altitude to maintain the glide path, as stated by FLIP GP, para 5-22a(1) (d)?

A — Yes. When cleared for an approach, report when vacating an assigned altitude, as required by the above mentioned paragraph.

Q — Must I file a DD Form 1801 to fly non-stop from Barksdale AFB to Eielson AFB, Alaska?

A — Yes. FLIP GP, para 4-1b, states that a DD Form 1801 will be used ". . . for those flights originating within the conterminous United States and Canada destined non-stop to points beyond these areas . . ."

Q — AFR 60-16, SAC Supplement, no longer contains information concerning the maximum allowable distance between points when filing fix-to-fix navigation. Is there anything in writing that prohibits me from filing fixes in excess of 260 NM?

A — AFR 60-16, SAC Supplement 1, para 3-2, references FAA HANDBOOK 7110.65 concerning degree-distance route filing. The following information was extracted from 7110.65 and details the criteria used in properly filing fix-to-fix navigation between NAVAIDS.

a. The NAVAIDS selected are VOR/VOR-DME/VORTAC/TACAN NAVAIDS authorized for use at the altitude being flown and the distance from the NAVAID should not exceed the distance criteria for the NAVAID being used.

b. The distance between the fixes used to define the route does not exceed:

(1) Below FL 180 - 80 miles except that for celestial navigation flights. The distance in (2) shall apply between fixes used to define the celestial navigation portion of the route of flight.

(2) FL 180 and above - 260 miles.

Q — If I am turning to or established on the outbound leg of a holding pattern and subsequently cleared for the approach, must I make an immediate turn to the IAF for the penetration?

A — No. If you are established in the holding pattern and are subsequently cleared for the approach, you must penetrate the next time you cross the IAF.

However, you may complete the outbound leg you are presently flying before turning inbound.

Q — If an airfield has both a TACAN and a VOR, can I use these navigational aids interchangeably for azimuth information?

A — FAA Handbook 6050.5 and FAA Selection Order 1010.65 both state that if the TACAN and VOR are located within 30 meters of each other, they may be considered co-located for enroute and approach procedures. If they are located within 600 meters of each other (2000 feet) they may be considered co-located for enroute procedures but require separate approaches. For the enroute phase of flight you may use either VOR or TACAN azimuth information when the station appears on the enroute chart as a VORTAC. For an instrument approach, you may use either VOR or TACAN azimuth if the station is depicted as a VORTAC on the approach procedure. However, if only one type of aid appears in the name of the approach (i.e., VOR RWY 17 or TACAN RWY 17), you must use that facility for final approach guidance (FAF to MAP). Additionally, if you intend to use other than the specified facility during the penetration or approach, check the IFR Enroute Supplement to insure there are no restrictions placed on its use.

Q — On a recent VIP flight, I was to land at a civilian airport to pick up passengers. I carefully checked the NOTAMS before departing and found nothing of any significance. However, upon arrival at the civilian airfield, I found that the first 3,000 feet of the runway was closed for repairs. Why wasn't this in the NOTAMS?

A — Welcome to the world of civilian aviators. Airfield NOTAMS and procedural changes affecting a civil aerodrome may not always be obtained via the base operations computer. Anytime a proposed flight is to terminate at a civil airport, and the airport is only partially covered by the USAF NOTAM system (check NOTAM symbol in Enroute Supplement), FAA NOTAMS should also be requested. In addition, The Airmen's Information Manual, part 3a, should be consulted for NOTAMS of a more permanent nature concerning procedural changes and airfield construction. AIM 3a is printed every 14 days. If a NOTAM is contained in AIM 3a, it may not appear elsewhere. For further information on civil NOTAMS, see FLIP GP, para 5-4(b).

Q — If a SID directs me to fly a heading to intercept a course, should I apply a drift correction to the heading?

A — Yes. You should attempt to fly the ground track as closely as possible to assure yourself of maximum obstacle clearance. If your Doppler or inertial drift is inoperative consider the following for drift information:

(1) estimated wind from a previous leg.
(2) wind obtained from pilot to forecaster.
(3) forecast wind from weather briefing.
(4) if operating near the surface, the wind given by ATIS, approach control or tower may be used as a last resort.

Your individual questions are welcomed and encouraged. **Write 1st Combat Evaluation Group (STI), Barksdale AFB LA 71110, or call Autovon 781-3648.**

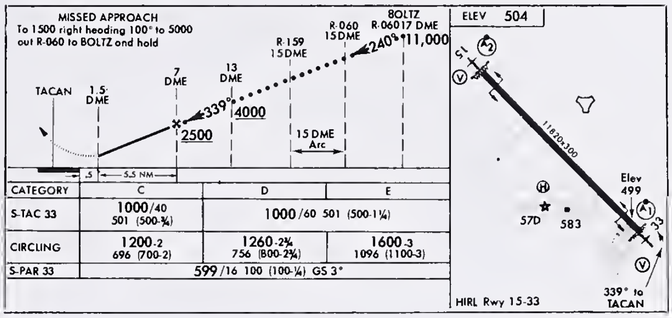
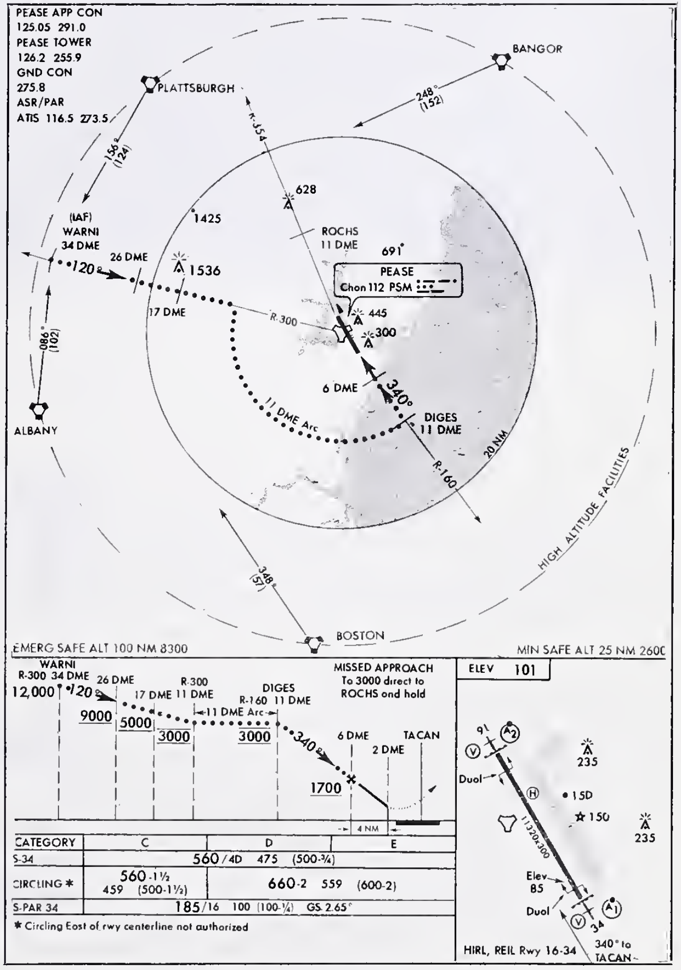


Fig. 1

Fig. 2



THE DIRTY LAUNDRY SYNDROME

Capt. Michael D. Blanchard
HQ SAC/DOSF, Offutt AFB

Capt. Bob McClean, flying safety officer for the 89th Bomb Wing, was disturbed even though he had just watched the B-52 make a successful six-engine approach and landing. Earlier, the command post had notified Bob that both engines had flamed out during climbout and the crew was unable to restart either engine. What concerned Bob was the fact that he was a close friend of the IP on board and knew he would have followed Dash One procedures. He also knew the IP would check all other possibilities; i.e. switch positions, air intakes, circuit breakers, etc. So why didn't the crew get an airstart? Bob decided he would have a discussion with the engine specialists in QC and find out why.

During the course of his investigation, Bob discovered that the flameout occurred when a new copilot had inadvertently turned off the wrong fuel switch, thereby causing fuel starvation of number seven and eight. The IP had taken appropriate action to reroute fuel to the affected engines, but was unable to restart either engine by Dash One procedures.

The investigation revealed that the failure to accomplish an airstart was due to the fact that the cannon plugs for the fuel control units were switched. The result was that the throttle for number seven operated the fuel control to number eight and vice versa. After finding this out, the first question that came to his mind was: "How did the crew get those engines started in the first place?" The answer was found in the normal starting procedures for the B-52. After two engines have been started separately, the remaining engines are started simultaneously; therefore, seven and eight started as if they were operating off their own throttle. However, during airstart procedures, each engine is started separately.

Now Bob's problem was how to report an incident like this without making the wing look too bad. He had wrestled with various wordings, but had finally given up and decided the wing would just have to "bite the bullet" and tell it like it is. After all, doesn't Murphy's Law apply? If an aircraft part can be installed incorrectly, someone will install it that way! Bob completed the report and sent it to the wing commander for release.

The next morning, Bob received a message that the Old Man wanted to see him. As he approached the commander's office, the Old Man looked up and smiled.

"Come in, Bob."

"Good morning sir, did you want to see me about that mishap report? Is something not clear?"

"Not really, Bob. It's a good report, but I'm not sure we should send it out."

"Sir, we really don't have a choice. AFR 127-4 requires a report on all two-engine shutdowns. Even more important, it might save someone else from doing the same thing and having an accident."

The commander leaned back in his chair and stared at the ceiling a moment before he replied. "Let's be realistic, Bob. If we send this out we will embarrass the wing. We would be hanging out our dirty laundry for the entire command to see. You really don't want other wings making jokes about our crews and maintenance men, do you?"

"No sir, but this report might prevent someone else from making the same mistake and possibly getting hurt or losing an aircraft. I think it's our professional responsibility to report this."

"Oh, I don't know, Bob. I think you might be exaggerating a little bit. This really was a fluke incident that wouldn't happen again in a hundred years. I really doubt if a report would do anybody any good. It will just make us look bad. I appreciate your good work, but let's just leave this mishap report here in the wing. You work up a procedure so it can't happen to us again, and we'll let it go at that."

Bob was tempted to argue further, but he had discovered early in his military career that you can press your opinions only so far, and then you must desist. He felt he had reached that point. Besides, he rationalized to himself, if I were truly honest with myself, I would admit a measure of relief at not sending out the report. After all, it could reflect poorly on me as a flying safety officer.

As Bob walked back to his office, he knew he would not sleep too well that night. He felt he should have sent out the report. Even the best wings have people who make mistakes, he mused. After all, a wing is made of humans and "to err is human." What does the Old Man expect? Why in the hell can't we just be mature enough to admit our errors and let everyone learn from them?

By the time Bob finished his second beer at happy hour that night, he had convinced himself that it really wasn't such a big deal and he would forget the incident and keep trying to do his job the best he could.

Exactly two months later, Bob was checking the daily distribution in his in-basket when he noticed a mishap report from another B-52 wing. The message read, "On attempted six-engine missed approach, pilot lost control of aircraft. The crew ejected, but the occupants of downward ejection seats received fatal injuries." Bob felt a tight constriction in his throat as he skipped down to the findings and cause factors.

Finding 1. Number one and two engines flamed out during flight due to copilot fuel mismanagement (Cause).

Finding 2. Number one and two engine would not restart because cannon plugs for fuel control units and throttles one and two were switched. (Cause).

Bob didn't read any further; he had a sick feeling in the pit of his stomach. He knew the price his wing had paid to prevent embarrassment was the highest extracted in Air Force aviation — loss of human lives, fellow crewmember lives . . .

This story is fiction. As many of you know from previous safety meetings and publications, the problem of switched cannon plugs actually occurred in a B-52 unit, but it was reported through proper channels — with strong support from the wing commander.

Adapted from *Approach* magazine article, "Don't Embarrass the Command," by Richard P. Shipman.

An IP Reports on . . .

EMERGENCY AIR BLEED LEAKS

INDICATIONS								
	Oil Press	EPR	RPM(%)	EGT(%)	F/F	Generators	Oil Press Warn Lites	Fire Lites
No. 1	40	Unreliable	88	340	Unreliable	OK (145amp)	OK	—
No. 2	39		87	320		—	OK	—
No. 3	40		88	330		Tripped	OK	—
No. 4	22		89	*0-500		—	OK	—
No. 5	42		65	300		Tripped	ON	Steady
No. 6	39		22	100		—	ON	Steady
No. 7	69		79	300		Tripped	ON	Flickering
No. 8	40		0	100		—	ON	Steady

Capt. Mike Mankin
68 BMW, Seymour Johnson AFB

The mission was scheduled as a routine pilot upgrade sortie (PUP). The mission was an IP's dream — a MITO takeoff, cell formation up to air refueling, and then direct back to the local area for extended transition. However, this IP's dream turned out to be anything but routine. The mission went quite normal through the MITO briefing, preflight, taxi, and initial portion of the takeoff roll. We were number three in the three-ship B-52G MITO and the PUP in the left seat was doing a great job for first attempt at a close interval takeoff. I was in the right seat as the IP. Then, at unstick speed, is when all resemblance of a routine mission ended.

As the aircraft became airborne all engine instruments on the right (engines 5, 6, 7, 8,) started fluctuating erratically. All four right side low oil pressure warning lights were illuminated. Generators numbers 3 and 5, and number 7 tripped off the line. Multiple circuit breakers on both the left and right load centrals had popped. Even with all these electrical trips and fluctuations the water injection system continued to give our 410,000 pound aircraft the additional thrust we required.

As the flaps retracted to approximately 30%, the water ran out and power was increased to MRT. At that time the number 6 engine fire light came on steady. The engine was retarded to idle and the fire light stayed on steady. As soon as the flaps were up, the engine was shut down completely and the light remained on. The adjacent engine was then retarded to idle in accordance with Dash One procedures but the number 6 engine fire light stayed on steady. There was no visual indication of fire. Only seconds later, the number 8 engine fire light came on steady and was retarded to idle. The number 8 engine fire light remained steady and was soon followed by the flickering and then steady illumination of the number 5 engine fire light. The number 8 engine was then completely shut down. At that moment the number 7 engine fire light started flickering and its throttle was retarded to idle. This all happened at once, and we were only 1000 feet above the ground! Throughout all the fluctuations of engine instruments and illumination of fire lights, the EGTs on the affected engines were slightly erratic but never a visual confirmation of fire. However, all the other indications of a fire were present, i.e., erratic engine instrument indications, fuel flow fluctuations, and RPM fluctuations. From all indications in the cockpit and from the almost orderly manner in which the lights illuminated, it appeared from all these inputs that we had fires.

About this time, we terminated cell integrity with the cell leader, informed him of our problem, declared an emergency with departure control and then sat back and took a deep breath and tried to ascertain exactly what our problem was. The airplane flew remarkedly well with two engines shut down and two back at idle. Full left rudder trim was required and about five degrees of bank into the good engines. At this time, our primary concern was to fly the airplane first. In keeping with this thought, we continued to maintain runway heading and requested to level off at 6000 feet MSL.

Command Post was then notified of our situation; however, I'm sure they were very much aware of our problems as we had used 321.OMHZ for cell interplane frequency. I requested an immediate Hotel Conference and as we leveled at 6000 feet MSL completed applicable items and the climb checklist to include going to 7.45 on the air conditioning master switch. My reasoning for going to 7.45 was that engines number 3 and 4 were operating normally, it was very warm from excitement in the cockpit and at that moment I had not related an air bleed malfunction to our problem. When the number 8 engine was shut down, all fluctuations of the engine instruments ceased. However, we still had the following indications as shown in Figure 1.

With the above indications, we proceeded to a holding pattern to the east of the field to conference our problem with the applicable agencies (Boeing, SAC, 8AF, and local conferees). At approximately 30 minutes after level-off, a local pneumatics technician assisted us tremendously by having us note the manifold temperature and go back to RAM position on the air conditioning master switch. This decreased the manifold temperature from 210°C to 40°C in about five minutes. To put it mildly, we breathed much easier from this point on. Also, the number 3 generator was re-paralleled and this evened the amperage load to approximately 50a each.

The remainder of the flight was almost, again "routine." Fuel was burned down to a gross weight to 325,000 pounds in a clean configuration and then airbrakes were used to increase the fuel flow. At 310,000 the airbrakes were retracted and the gear extended. There was some concern whether or not our gear would extend normally due to the possible burned wiring. Nevertheless, the gear extended normally with the right tip gear taking 20 to 30 seconds longer than the rest. At 295,000 pounds, a shallow descent was started to position the aircraft on a 25 mile straight-in precision approach. Flaps were extended in the descent so that power changes would be kept to a minimum. Once we were established on final all six engines were used for the thrust required. A normal six-engine approach was planned and flown with the exception that the drag chute failed to deploy on the first attempt. The aircraft was taxied to the parallel taxiway and shut down for a maintenance tow to the parking spot — MMC!

On postflight inspection, the aircraft was found to be physically scorched underneath the right wing. The pressure relief blowout panel (located inboard of the number 3 pod) was missing. The access panel to the right wing leading edge was removed and a hot air duct near the right wing root was found to be ruptured. Several wire bundles were burnt through and fused in this area and some structural members were discolored.

Air bleed leaks are rare in the G-model, however, they do occur occasionally in the D-model with the number of systems pneumatically operated. Having flown the D-model and seeing this in the D simulator made the indications we were getting more apparent. However, the first and most beneficial thing we as a crew did was to fly the aircraft first and then sit back and analyze the problem and take corrective actions. I believe this patience and the expert guidance we received from all ground agencies definitely saved a valuable aircraft and crew.

LONG ROAD HOME

continued from page 11

stacle cleared); S-1 (we're goers!); rotate (keep the wings level); positive rate of climb, "gear up" (another sigh of relief) and smooth flying to 285 KIAS. Right now all the ground delays seem incidental; I have four good engines and a "clean" airplane; and only three hours to St. John's, Newfoundland.

Oh you spoke too soon! Departure can't pick up our IFF/SIF. After a few recycles and a CB check, I decide that maybe the gremlins will work themselves out by the time we reach radar control again. As we get into the clouds, the copilot starts working on the HF. No problem there; the HF on this airplane has worked well all week long. No such luck G.I. Somehow, in switching controls from the navigator's to the copilot's position, the radio decided that it did not want to transmit and the standard litany of fixes proves fruitless.

I tell the copilot that he's got the airplane and to try to contact the tanker that departed five minutes ahead of us for UHF relay of our position reports. Meanwhile, the boom and I head to the rear and attempt to find if the trash in the back can be of any help to us. As the supply sergeant looks through his index, the crew chief tells me that he could swap HF control boxes. We find the correct crate, unstrap it, open it, and learn that we don't have an HF control box on board; the index of parts had been inaccurate. So much for that, we should be able to use the "party line" to get across the pond. After double-checking that all the crates are resecured correctly, I go forward thinking that there aren't any pending problems, and I'll be able to stop and evaluate the entire situation.

Wrong again! Passing the nav, he tells me that the radar has just died. That development sends the boom into the wine cellar to check the fuses. No luck there, so yet another piece of equipment down the tubes.

The copilot has gotten us to FL280 and has taken care of the position reports and level off check.

We're listening on HF just as a back up. I grab a cup of coffee and try to catch my breath. As I review the situation: the HF loss should be no problem if we stay in touch with our buddy up front until we get to land, then it won't be any problem at all; the weatherman did not even hint at any thunderstorm activity but I would like to have the radar — just in case. The IFF/SIF loss is rather perplexing. If we have to divert, then it could be a real problem for approach control; also, would I be able to get normal enroute service or would center be reluctant to grant my requests if they can't identify me? Only time will tell on that. Noting that we are now 7000 pounds short of the fuel curve, I realize that should we have to make a pit stop we will undoubtedly run out of duty day limits. How bad the headwinds are will be a deciding factor. Lastly, I ask myself if I have made objective decisions or was I swayed by "get-home-itis?" If worse came to worse, then we could pull up short and go home the next day.

The excitement over, the hours begin to drone by. We reach St. John's and say goodbye and thanks to our relay bird. The fuel situation isn't getting any better so we ask for a climb to FL 350. Center can't pick up our squawk. We explain our problem and get cleared to FL 310. When we level off, I'm glad that we didn't get any higher. The true is 460 and the ground speed is only 350, and we're still burning about 12,000 pounds per hour. This is no way to run a railroad!

I now feel certain that we will get some gas at Grand Forks, so we now look at the approach plates with earnest and think about the ramifications of a duty day extension. On the east side of Grand Forks we get a phone patch with Fairchild stating that the fuel has degraded to a point that we will have only 10,000 on the ground, and get another update on the weather at Grand Forks. All parties agree that we should get refueled. Also, Fairchild starts working on a four-hour duty day extension. The weather at Grand Forks hadn't changed much in the four hours that we had been monitoring it so that eliminated any surprises. Suffice it to say that it was an uneventful descent and landing.

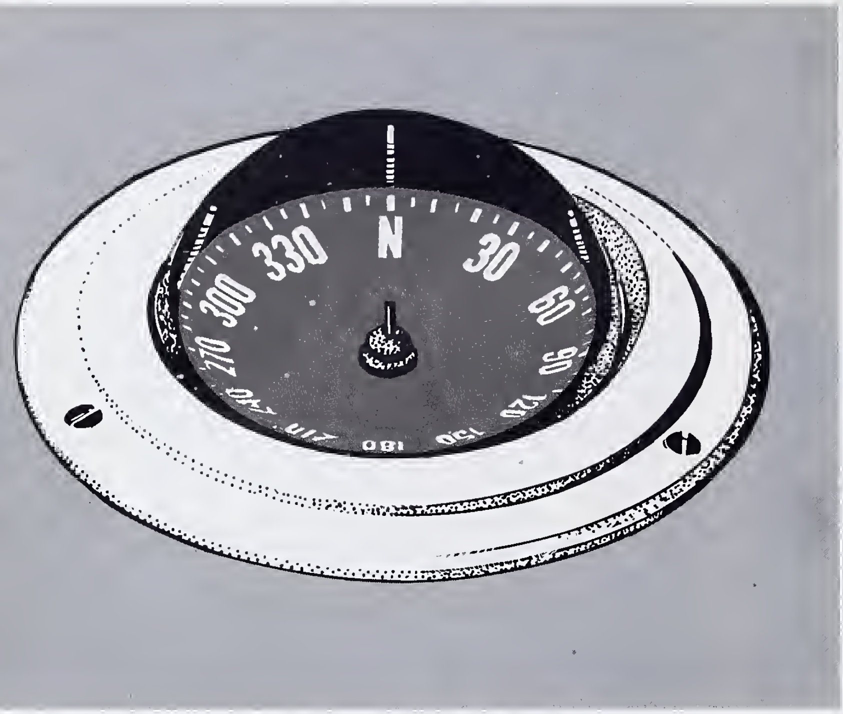
I was aware that the additional descent, landing, takeoff and departure sequence would cause a greater workload on a crew that had already put in a 12-hour day. During the short wait for the customs agent, I again weighed the circumstances. Our maintenance problems were no longer primary; we were back in friendly territory and the weather VFR, even if the sun had gone to sleep for the night. My main concern now was obviously crew fatigue. Simply stated the problem was whether my crew would be able to cope with the worst possible situation that could arise in the short hop from Grand Forks to Fairchild? I knew that they would be able to handle it if everything went normal-normal, but so far nothing had been normal.

An hour and a half later, as I pushed up the throttles, I felt 90 percent certain that the right decision had been made. The 10 percent kept saying to me, "Watch out, be careful." It also kept me looking ahead for any surprises. The only hitch would be the weather. The forecast was for clear and a million. When I asked about fog the answer was, "None reported and none forecast." But I had been at Fairchild for four years and I knew better.

Although our inflight update of the weather did not pick up the fog either, the first words from the command post were RVR 30 and decreasing. At 10 miles out the SOF reported that the visibility on the other runway was better. Unfortunately it was too late to find out if the VASI were working on that end. The VASI would be our only glide path information on that runway and all things considered, I really wanted some sort of glide path information. We pressed on and although everyone was on the edge of their seats, the landing was well within 60-4 tolerances. It was quite a letdown when halfway down the runway the fog ceased to exist — absolutely clear.

After shutting down the engines, I mused over the myriad of decisions that I had made during the long 24 hour day. I knew that simply having traveled the long road successfully was no seal of approval and that the outcome could easily have changed. Nonetheless, I felt that I had made the correct choices and, with the support of a good crew, had maintained a fine balance between mission accomplishment and "get-home-itis."

It sure was good to be home.



COPING WITH THE COMPASS

Capt. Michael R. McNeill
28 BMW, Ellsworth AFB

There you are, cruising along two hours after coast out. You've just finished the hoagie from your number four box when that bright red comparator warning light comes on and stares at you with all the insistence of an O'dark-thirty alarm clock.

"What's the J-4 say, Co?" you ask, even though you have one of your own.

"Two-six-zero, and leave me alone 'til I'm done with this position report."

"Nav, Pilot, I think the J-4 is bad. My N-1 still shows two-six-six — the last heading you gave me."

"Roger, Pilot . . . I show us on heading back here. Co, say J-4?"

"J-4 is two-six-zero, and leave me alone — I'm trying to talk on HF. Those MAC AIREPS are driving me crazy."

"Nav, Boom, do you want to take a heading check?"

"Yeah, I guess so. Jump up there and I'll get you some numbers."

So the Nav and Boom take a celestial heading check, and then . . .

"Pilot, Nav, our heading is two-five-nine. It looks like the J-4 is correct and the N-1 has been drifting us left. Stand by for an alter, and we'll take a fix."

"What do you mean the J-4 is good? It's the one that's drifted off heading; the N-1 is right on your last heading."

"I don't know, Pilot, maybe the autopilot turned the airplane along with the N-1 compass."

"No, no, that only happens if VOR-LOC or HEADING SELECT is engaged. It's got to be the J-4 because we're still on heading."

"Boy I hate position reporting — Hey, Nav, it looks like my J-4 compass has drifted off heading."

"Pilot, Boom, can you use the whiskey compass?"

"We can try, but I don't think it's very accurate. We have to pull a circuit breaker somewhere before it's accurate."

"Boom, Co, it's the landing gear lever lock circuit breaker on the T/R number one area of the main circuit breaker panel."

"Okay, it's pulled, what does the compass read?"

Okay, Nav, it's two-five-seven plus a two degree correction — that's two-five-nine. Maybe the J-4 is right after all."

Yes, crew, the J-4 was correct after

all. The N-1 looked normal, therefore it looked correct, but after some troubleshooting, it was discovered to be the culprit.

In MAG (slaved) operation of the N-1, the autopilot will maintain the heading under the lubber line of the pilot's HSI. If the N-1 compass drifts, the autopilot will follow the compass with a barely noticeable bank angle. Thus it maintains what appears to be the correct heading. Meanwhile, the J-4 shows the actual magnetic heading and appears to be drifting off the desired heading.

Any time the navigator turns his latitude correction control knob out of the OFF position, the N-1 compass goes to the directional gyro (unslaved) mode. The autopilot still gets its heading information from the N-1 system, but it will not follow the N-1 if the compass is turned or drifts right or left. This prevents the autopilot from trying to fly itself out of GRID when the navigator slews the compass around, and allows him to reset the N-1 after a celestial heading check.

So what's a navigator to do if his N-1 compass drifts during slaved operation? Unslave it for sure. That will stop the autopilot — or the pilot — from altering the aircraft any further. Next, there are at least three other reasonable options. You could continue with correct magnetic headings set in your unslaved compass, you could set and fly true headings — a great simplification for celestial heading checks, or you could go ahead and enter GRID. It's familiar, the lines are on the chart, and it works.

Not all compass malfunctions are this simple, and sometimes when it rains, it pours (overcast with both compasses spinning around). Just remember, make a systematic analysis, trust celestial information (and the magnetic compass if you're not over the frozen north), and don't let the autopilot continue to make unplanned heading changes.

ARF UNITS NOW ELIGIBLE

Recently, General Ellis approved a policy that will allow SAC-gained Air Reserve Forces to be eligible to receive the Major General Alfred F. Kalberer Outstanding Airmanship Award. This award recognizes the outstanding single feat of military airmanship within the Strategic Air Command by a SAC aircrew or aircrew member. The details of nomination, selection and presentation can be found in SACR 900-21, 21 January 1977. This is a positive step in our support of the total force policy and a recognition of the fine job that is being done by SAC-gained Air Reserve Force units and individuals.

Maj Ken Mathias

Lt Col Jim Witters

FROM THE OHIO ANG

Editor,

Your article on page 27 of the December issue was in error as written. Captain Walters may have very well been the first active duty SAC navigator to perform SOF duties; however, many Air National Guard navigators have been performing these duties for over 10 years.

Air National Guard tanker units have been an integral part of the SAC Total Force Concept since July 1975, and it should be noted that ANG navigators have been accomplishing SAC Supervisor of Flying duties since that time. Among these navigators are Lt Col Jim Witters and Maj Ken Mathias of the 160 Air Refueling Group. Prior to assignment of SAC as their gaining command, Jim Witters and Ken Mathias had performed SOF duties for KC-97L's under TAC for over eight years.

Air National Guard navigators are proud of the contributions they make to the Supervisor of Flying Program and feel that these contributions should be duly noted.

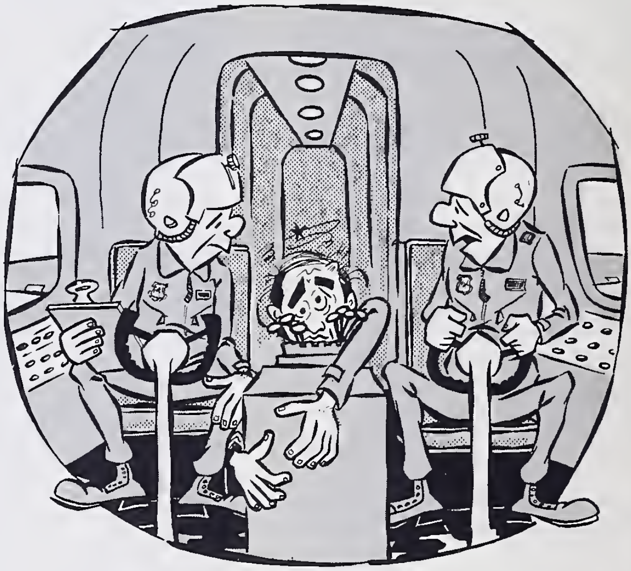
Maj Kenneth M. Mathias
Rickenbacker AFB

We agree that these contributions should be duly noted. In addition, we intend to continue to recognize the contributions of all SAC-gained Air Reserve Force units and individuals.Ed.

OPS HAZARDS

Potential Busted Head — During a recent -135 mission, it was noted that passengers began to move about the aircraft while it was still taxiing. By standing, they exposed themselves to the hazard of being thrown about the aircraft if the pilot had to brake abruptly. If this had occurred, severe and possibly fatal injuries could have resulted.

Crewmembers must insure each passenger is briefed and understands the requirement to remain seated until taxi operations have terminated. Crewmembers must also remain seated unless movement within the aircraft is required to perform specified duties. Failure to insure compliance may result in a Class A mishap classification if injuries sustained are serious enough.



I SUPPOSE THIS WILL AFFECT MY NOMINATION FOR A DISTINCTIVE LAPEL PIN.

BUSTED PINS

MINUTEMAN. A missile maintenance team (MMT) was dispatched to a launch facility to remove and replace a missile guidance set (MGS). The team members connected the guidance and control (G&C) umbilical cable hoist support and chain hoist and began to align and mate the G&C umbilical cable plug to the MGS receptacle. The two team members stated that during the torquing procedure, the chain hoist failed and caused the G&C umbilical cable plug shear pin to shear which allowed the G&C umbilical cable to drop and strike the side of the launch tube wall. The impact resulted in 16 bent and/or damaged pins.

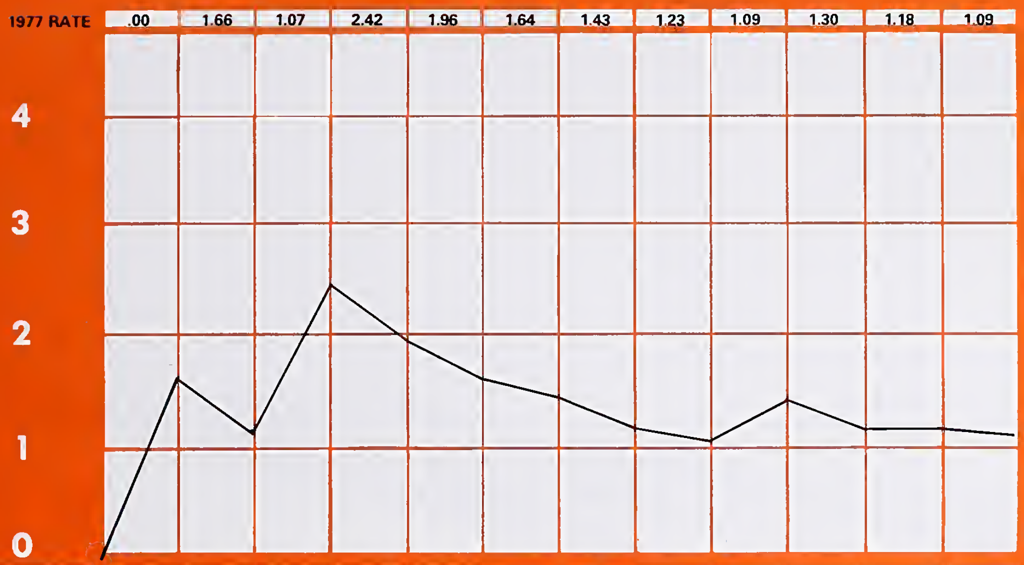
Investigation revealed the MMT team chief was not watching the operation at the time of the mishap because he was preparing for an electrical checkout and leak test for the umbilical. This, however, is a normal and acceptable practice during the umbilical mating procedure. The tech data used is adequate and not confusing.

The chain hoist was removed from service and examined. Attempts to duplicate the malfunction of the chain hoist met with negative results during subsequent weight checks. Tear down analysis of the hoist revealed no abnormalities. The cause of the mishap was attributed to the work cage technician not insuring the G&C umbilical cable plug was properly restrained in accordance with tech data.

A thorough investigation will always identify noncompliance with tech data. Disregard for tech data compliance will eventually result in a mishap. It could be that your failure to follow tech data will be the cause of a fatality or damage to a weapon. Do the job right and safely — FOLLOW TECH DATA.

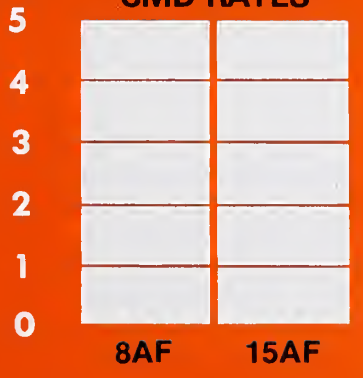
1978 Flying Safety Rate

SAC CLASS A MISHAP RATE (PER 100,000 FLYING HRS)



MISHAPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1977	0	1	0	2	0	0	0	0	0	1	0	0
1978	0											

1978 SUBORDINATE CMD RATES

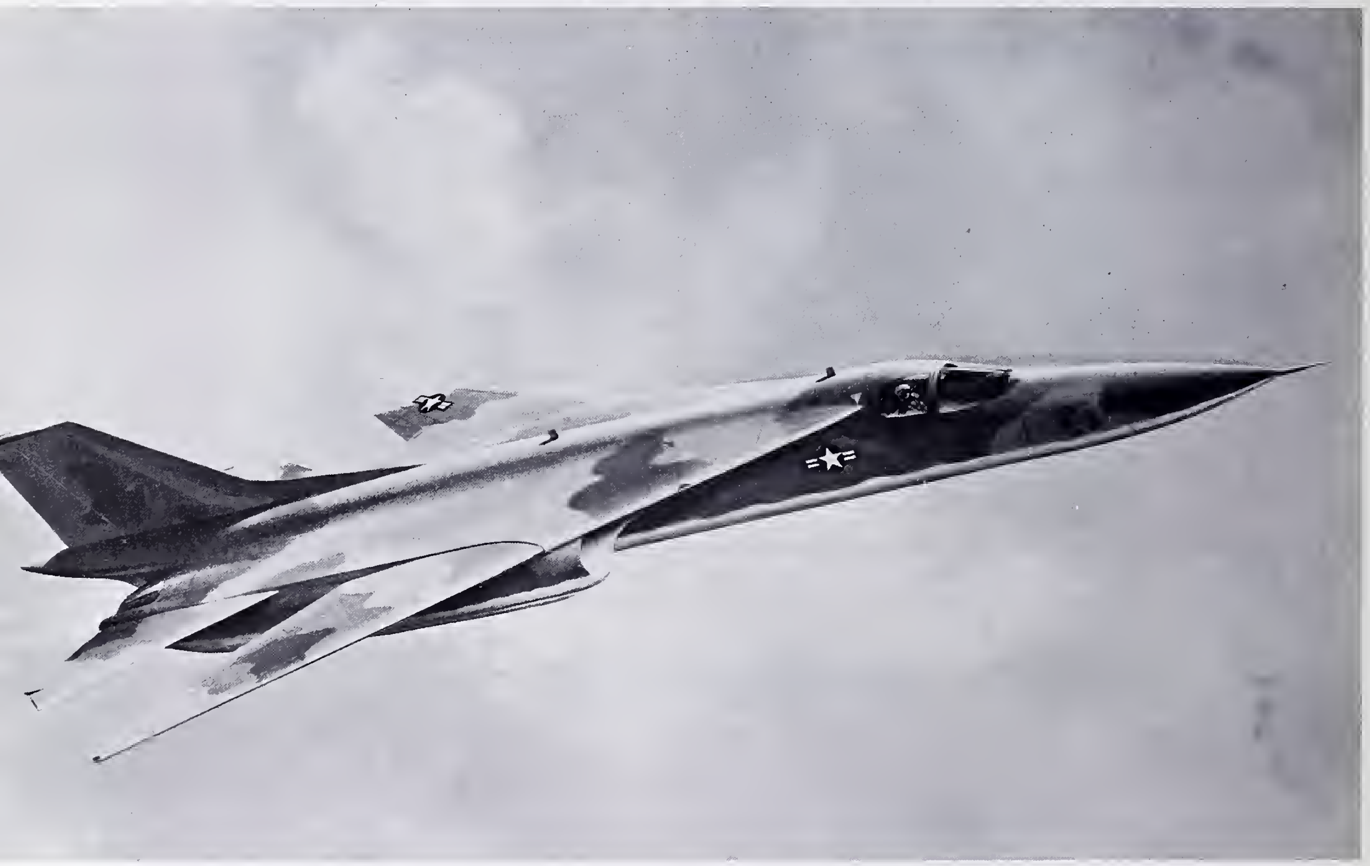


MISHAP STATUS

LEGEND ⁀ =1977 RATE

r&d corner

HQ/SAC — DIRECTORATE OF AERONAUTICAL REQUIREMENTS



Captain Al Barbier
HQ SAC/XPHV, Offutt AFB

FB-111H—PROPOSED STRATEGIC BOMBER — Long before the decision to cancel the B-1 bomber was made, General Dynamics had gone to the drawing board to lay the groundwork for updated versions of the FB-111A. When the President made his announcement, General Dynamics formally introduced plans for the FB-111H. The "H" having been derived from the existing -111 series aircraft, will bear a natural resemblance to its predecessor. There will be numerous differences, however, both internal and external, the most obvious being size. The "H" plan calls for an aircraft almost 13 feet longer than the FB-111A with overall length at just over 88 feet. At the top of the vertical stabilizer it will stand 22 feet tall; almost five feet taller than the "A". Since the same wings and wing carry-through box will be used, the wing span will remain at 70 feet. The variable geometry wings will similarly be capable of sweeping from 16 degrees for slow speed operation such as takeoff and landing, to 60 degrees for the higher speed region of the flight envelope. Finally, the fuselage has been expanded to accommodate an increased internal weapons load, the General Electric F-101 turbofan engines originally designed for the B-1, and the new main landing gear design.

When designing the -111H, General Dynamics considered two of the most important characteristics of a strategic bomber: range and payload. The range will be substantially increased over the FB-111A. This will be accomplished within the "stretch" by incorporating larger fuel tanks, effectively doubling the internal fuel capacity combined with the efficiency of the modern F-101 engine and the capability for inflight refueling will combine to give the FB-111H a very impressive range.

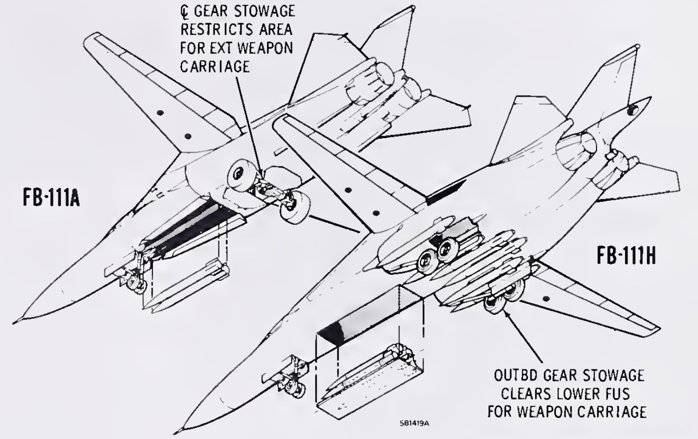
The payload of the -111H will be increased by doubling the volume of the weapons bay and incorporating a rotary pallet capable of holding a maximum of five weapons. The payload will be further increased by redesigning the main landing gear so that it retracts into the sides of the fuselage, leaving the underside of the aircraft open for low drag comformal weapons carriage. With this configuration, space is available for four weapon stations between the gear and one on each side of the fuselage outboard of the gear. There are also three pylon stations on each wing capable of carrying weapons or the aforementioned 600 gallon drop tanks. This versatility will provide the planner with a much desired targeting flexibility.

At the very aft end of the fuselage is a concept adopted from the B-1: an auxiliary power unit. The APU can be used to start both engines simultaneously during an alert start or for day to day maintenance to drive the accessory section and run the hydraulic, electrical and environmental systems.

State of the art equipment will be employed in the offensive and defensive avionics suites. The exact components are still being studied, but current plans call for a dual inertial navigation system tied to a multi purpose computer complex. The defensive suite definition is also being developed with emphasis placed on the utilization of evolving technology, in this case the Advanced Self-Protection Jammer (ASPJ) or similar technology to insure its flexibility and ability to counter existing and future threats with a minimum of future costs.

All in all, the FB-111H, with its all-weather and terrain following radar capability should prove to be a formidable weapons system. With the cancellation of the B-1, the FB-111H, if built, would become the newest bomber in SAC's fleet, capable of penetrating deep into hostile territory in support of national objectives. The future of this weapons system and the realization of the development efforts to date, are, as yet, unresolved.

FB-111H GEAR DESIGNED FOR INCREASED EXTERNAL WEAPON CARRIAGE


℄ GEAR STOWAGE RESTRICTS AREA FOR EXT WEAPON CARRIAGE
FB-111A
FB-111H
OUTBD GEAR STOWAGE CLEARS LOWER FUS FOR WEAPON CARRIAGE
581419A

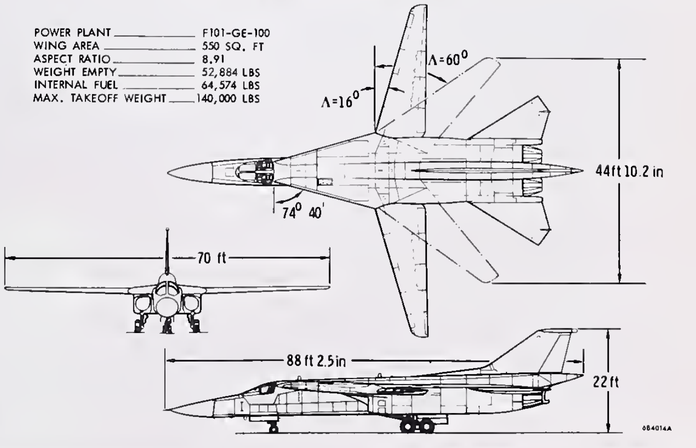
Notes of Interest

There have been several noteworthy events for you CROWS. Watch for an improved B-52 flare (ALA-17A) to arrive in the very near future. For information, see GIANT BLAZE II Final Report, 7 June 1975: Flare Type C. For the -111, both the ALR-62 Radar Warning Receiver and the ALQ-137 Countermeasures System are on contract to replace the APS-109A/ALR-41 and the ALQ-94. In addition to improved performance, these systems will provide improved man-machine interface.

Further news is the award of a contract for the Advanced Tanker Cargo Aircraft and for B-52 power management.

FB-111H GENERAL ARRANGEMENT

POWER PLANT	F101-GE-100
WING AREA	550 SQ. FT
ASPECT RATIO	8.91
WEIGHT EMPTY	52,884 LBS
INTERNAL FUEL	64,574 LBS
MAX. TAKEOFF WEIGHT	140,000 LBS



Major Paul H. Froeschner, pilot, and Lt Colonel Paul B. Bragdon, radar navigator, 380th Bombardment Wing, Plattsburgh Air Force Base.

HEADS UP FLYING CLUB — Approximately nine minutes after entry into the low level route, the pitot boom was struck by lightning or a static discharge. The crew saw a flash, heard a loud sound, and felt a concussion. The cockpit lights blinked off momentarily then came back on. The stall warning system activated (light/horn/pedal shaker). The speed brake light and the right engine spike light illuminated. The aircraft began to roll to the right. The pilot felt as though he was losing control of the aircraft. He selected afterburner and initiated climb.

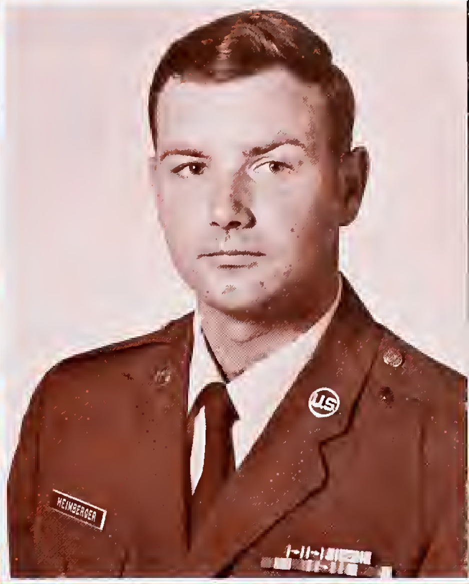
At this time, the pilot noticed the airspeed and mach indicators decreasing to zero and pushed the nose over. The RN checked the standby airspeed indicator and told the pilot that it read 530K. The pilot resumed the climb and broke out above the clouds at 15,000 feet. The pilot acquired a visual horizon and continued the climb to FL 230. Immediately after level off, the crew began to prepare for ejection. They checked their systems to see what they still had and what they had lost. They ascertained that they had lost the following equipment: primary airspeed indicator and mach tape; inertial navigation system; Doppler, digital computer complex (DCC); true airspeed indicator; astro; aux flight reference system (AFRS) flux valve (controls heading gyros); all heading indications including standby control unit; and roll trim. A KC-135 met and escorted the aircraft to home station. The aircraft was configured for landing, a controllability check was performed and the crew judged aircraft response to be adequate for landing. The crew successfully recovered at home station.

PROFESSIONAL PERFORMERS

Individuals selected for these pages as SAC's top professional performers of the month are chosen from nominations made by all SAC units. Selection is made only after all nominations have been carefully screened and those chosen meet the highest standards of excellence outlined in SACR 127-2.

SAFETY MAN — First Lieutenant Peter K. Kloeber, 42d CES Ground Safety Officer, Loring AFB, has been assigned to that position since April 1975.

His attention to detail and outstanding desire and motivation to excel in the performance of safety duties resulted in the last three inspections being rated excellent by the wing safety staff. In 1976, SAC/ORI inspectors stated that, "the 42d CES Safety Program was the best noted to date," and the 1977 ORI report contained only three minor discrepancies. Lt Kloeber is responsible for these achievements and is most deserving of recognition as SAC Safety Man of the Month.



MAINTENANCE MAN.

SSgt Craig L. Heimberger, 44th Strategic Missile Wing, Ellsworth Air Force Base.

TITAN Crew S-007, 570th Strategic Missile Squadron, Davis-Monthan Air Force Base: MCCC Capt Garland W. Padgett, Jr., DMCCC 2/Lt Ronald P. McCreary, MSAT SrA James T. Mercer, and BMFT A1C John M. Jenkins.

Minuteman Crew E-035, 91st Strategic Missile Wing, Minot Air Force Base: MCCC 1/Lt Edward F. Teigeler III, and DMCCC 2/Lt Gary L. Bledsoe.

MINUTEMAN — During a severe blizzard, crew E-035 experienced numerous losses of primary power in rapid succession throughout the flight area and in the LCC. They opened circuit breaker 14, 16, 18 to prevent possible damage to the motor generator. The crew noticed the smell of overheated wiring and processed the checklist to the point of LCC shutdown. They requested an indefinite block time for the LCC blast door and permission to keep the LCC operational for as long as possible. The DMCCC manually started the emergency air conditioning unit when it failed to start automatically. Thirty minutes later, the crew received notification from topside, through the alternate command post, that the topside diesel was throwing sparks from the exhaust duct and they directed the response to numerous security situations. To compound the situation, they received **launch in process** indications from all sorties in their flight. They transmitted an **inhibit** launch command but three sorties failed to respond. When a subsequent **inhibit** command drew the proper responses, the crew made the appropriate notifications. When commercial power returned, the normal environmental control system (NECS) failed to start automatically. The NECS restart switch was used to place the LCC on the NECS. During this third day of a three-day alert, the crew successfully solved numerous power problems, mechanical failures, potential fire hazards and an **inhibit** situation.

HALL OF FAME

TACTICAL FLYING

OVER TWENTY-ONE YEARS

170 AREFG, McGuire (NJANG)	NONE

OVER NINETEEN YEARS

171 AREFW, Greater Pittsburgh (PAANG)	Mar ’58
157 AREFG, Pease (NHANG)	Jun ’58
97 BMW, Blytheville	Aug ’58

OVER EIGHTEEN YEARS

940 AREFG, Mather (USAFR)	May ’59
307 AREFG, Travis	Sep ’59

OVER SEVENTEEN YEARS

19 BMW, Robins	Oct ’60
151 AREFG, Salt Lake City (UTANG)	Feb ’61

OVER SIXTEEN YEARS

161 AREFG, Sky Harbor (AZANG)	Apr ’61
126 AREFW, Chicago O’Hare (ILANG)	Apr ’61
134 AREFG, McGhee Tyson (TNANG)	Aug ’61
340 AREFG, Altus	Feb ’62

OVER FIFTEEN YEARS

301 AREFW, Rickenbacker	Jul ’62
96 BMW, Dyess	Aug ’62

OVER THIRTEEN YEARS

160 AREFG, Rickenbacker (OHANG)	Dec. ’64

OVER TWELVE YEARS

136 AREFW, Dallas NAS (TXANG)	Jun ’65
320 BMW, Mather	Jul ’65

OVER ELEVEN YEARS

452 AREFW, March (USAFR)	Sep ’66
92 BMW, Fairchild	Feb ’67

OVER TEN YEARS

55 SRW, Offutt	Jul ’67
2 BMW, Barksdale	Aug ’67
319 BMW, Grand Forks	Dec ’67
22 BMW, March	Feb ’68

OVER NINE YEARS

5 BMW, Minot	Feb ’69

OVER EIGHT YEARS

42 BMW, Loring	Sep ’69
141 AREFW, Fairchild (WAANG)	Oct ’69

OVER SEVEN YEARS

28 BMW, Ellsworth	May ’70

OVER FIVE YEARS

7 BMW, Carswell	Mar ’72
101 AREFW, Bangor (MEANG)	Mar ’72
416 BMW, Griffiss	May ’72
305 AREFW, Grisson	Aug ’72
376 SW, Kadena	Nov ’72

OVER FOUR YEARS

379 BMW, Wurtsmith	Apr ’73

ICBM

OVER FOURTEEN YEARS

381 SMW, McConnell	Nov ’63

OVER THIRTEEN YEARS

90 SMW, F E Warren	Jul ’64
1 STRAD, Vandenberg	Sep ’64

OVER TWELVE YEARS

308 SMW, Little Rock	Aug ’65

OVER SEVEN YEARS

341 SMW, Malmstrom	Apr ’70

OVER FOUR YEARS

390 SMW, Davis-Monthan	Jul ’73

To gain listing in the Hall of Fame, a SAC or ARF unit must be Class A mishap-free for 48 months.

SAC
SAFETY SCREEN

22 BMW, March Crew S-104: P Capt Gerald L Kraus, CP 1Lt Stephen C Ghering, N Capt George E Marrow, BO TSgt Robert E Loman

28 BMW, Robins Crew E-22: FP Capt F H Vogel, CP 1Lt J E Honea, RN Capt G W Walters, NN Capt R E Roberts, EW 2Lt E J Leone, AG Sgt J G Williams

43 SW, Crew R-16: AC Capt David C McCracken, CP Capt Donald N Whitten, NB Capt Edgar J Patterson Jr, NN 1Lt James R Burgeson, NE 1Lt William H Vanhorn, G SSgt Richard W Gallagher Jr

44 SMW, Ellsworth Crew S-160: MCCC Capt Richard E Llewellyn, DMCCC 2Lt Michael W Outten

51 BMW, Seymour Johnson Crew E-17: P Capt Curtis L Padgett, CP Capt William R Ryan, RN Capt Michael Chalifoux, N 1Lt Richard D Evans, EW Capt Duane K Klug, AG MSgt Martin L Taylor Jr

90 SMW, F E Warren Crew R-185: NCCC Capt John W Evans, DMCCC Capt Robert R Roper

92 BMW, Fairchild Crew R-115: P Capt Bruce R Ferrell, CP 1Lt Craig T Scott, N 2Lt Kenyon D Brooks, BO A1C Kevin A Gerfen

97 AREFS, Blytheville Crew E-111: FP Capt James D Phillips, CP 1Lt Roger T Olson, NN 1Lt Jon D Cooley, BO SSgt Samuel M Ballante

100 AREFW, Beale Crew E-154Q: P Capt Ervin J Robinson, CP 1Lt Terry L McCloskey, N Capt Stephen P Brun, BO SSgt Gerald G Treadwell

157 AREFG (ANG), Pease: P Capt Wayne L Bell, CP Capt Robert W Anderson, N Capt Robert T Radochia, BO SSgt Carl B Sneirson

308 SMW, Little Rock Crew R-029: MCCC Capt Leonard A Zigment, DMCCC Capt Joseph J Mulcahy, MSAT SrA James S Doherty, MFT A1C Robert J Delgado

321 SMW, Grand Forks Crew S-090: MCCC Capt Richard T Knight, DMCCC 1Lt Richard S Fuller

341 SMW, Malmstrom Crew E-134: MCCC Capt Lyle G Peck, DMCCC 1Lt William E Dahlgren

351 SMW, Whiteman Crew E-014: MCCC Capt Arthur S Olson, DMCCC 1Lt Allen G Richwine

381 SMW, McConnell Crew E-093: MCCC Capt Wayne E Weyer, DMCCC 2Lt Neil K Snyder, BMAT Sgt James K Purucker, MFT SrA Clarence H Burtts

340 BMW, Blytheville Crew E-26: AC Capt Thomas E Rea, CP Capt William J Fier, RN Capt Ernest K Townsend Jr, NN Capt Samuel W Gamble III, EW 1Lt Thomas M Singleton, AG SSgt John R Smith

379 BMW, Wurtsmith Crew E-30: AC Capt Paul G Deehan, CP Capt Michael P Sjoberg, RN Capt Dennis O'Brien, N Lt Robert A Coe, EW Capt John D Barton, G TSgt Jessie R Morgan

911 AREFS, Seymour Johnson Crew E-110: P Capt James S Lehman, CP Capt Konstantin Volodzko, N 1Lt Russell W Patterson, BO SSgt James E Robertson Jr

912 AREFS, Robins Crew R-115: FP Capt J T Rudd, CP 1Lt B E Loftus, NN 1Lt C R Jones, BO SSgt B J Carley

912 AREFS, Robins Crew S-103: IP Capt L W Fussell, CP Capt B A Dunn, CP Capt W J Gift, IN Capt W M Moran, IS MSgt B J Henning

920 AREFS, Wurtsmith Crew E-114: P Capt Ronald E Crumbo, CP Capt George W Dorris, N 1Lt Douglas A Samuels, BO A1C Christopher R Burkhart

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW SACR 127-2.*

★U.S. Government Printing Office:
1978-765-129/1

UNIVERSITY OF FLORIDA
3 1262 09305 0036

Help Wanted
Editor
Combat Crew

The present editor of Combat Crew Magazine will be completing his assignment at HQ SAC in July. The vacancy will be filled this summer. Desired qualifications include: experience as a SAC aircrew member, major or major selectee, diversified Air Force experience (missiles or maintenance), training or experience in journalism, and at least three years on station at the time of reassignment. Applicants should forward a one-page resume to HQ SAC DOSE, Offutt AFB, NE 68113. Include AUTOVON phone number and any special qualifications that you consider important.